

Listing of Claims

1. (Currently Amended) A method of tracking an instrument ~~(5)~~ that is inserted into the body of a patient (4), comprising the steps of:

a) detection of a movement signal which represents the movement phases of a periodic internal movement of the body;

b) generation of 2D images ~~(4)~~ of a body volume of interest, and storage thereof in an image database together with the associated imaging parameters and the associated movement phase;

c) measurement of the spatial position of the instrument ~~(5)~~ ~~and optionally of the spatial position of at least one reference probe (2, 3)~~;

d) selection of at least one 2D image from the image database, which 2D image corresponds in terms of its associated movement phase to the movement phase belonging to the measured spatial position of the instrument ~~(5)~~;

e) determination of the position of the instrument on the selected 2D image.

2. (Currently Amended) A method as claimed in claim 1, ~~characterized in that~~ wherein an electrocardiogram and/or a breathing movement signal that is dependent on the breathing movement of the patient ~~(4)~~ is detected as movement signal.

3. (Currently Amended) A method as claimed in claim 1, ~~characterized in that~~ wherein the position of the instrument ~~(5)~~ is represented superposed on the selected 2D images.

4. (Currently Amended) A method as claimed in claim 1, ~~characterized in that~~ wherein, in step d), only 2D images from a single movement phase are available for selection from the image database.

5. (Currently Amended) A method as claimed in claim 1, ~~characterized in that~~ wherein steps b) and c) to e) are carried out a number of times and in varying order.

6. (Currently Amended) A method as claimed in claim 1, ~~characterized in that~~ wherein the image database contains 2D images from various projection directions.

7. (Currently Amended) A method as claimed in claim 1, ~~characterized in that~~ wherein the 2D images are generated in step b) by means of X-radiation and/or ultrasound.

8. (Currently Amended) A method as claimed in claim 1, ~~characterized in that~~ wherein at least one reference probe ~~(2)~~ is fitted on a movable X-ray device ~~(1)~~ which is provided for generating the 2D images ~~(1)~~.

9. (Currently Amended) A method as claimed in claim 1, ~~characterized in that~~ wherein at least one reference probe ~~(3)~~ is arranged on or in the body of the patient.

10. (Currently Amended) A method as claimed in claim 1, ~~characterized in that~~ wherein the breathing movement is compensated for using movement models of the body.

11. (Currently Amended) An arrangement for tracking an instrument ~~(5)~~ that is inserted into the body of a patient ~~(4)~~, comprising:

- a) a device ~~(1)~~ for generating 2D images ~~(1)~~ of a body volume of interest;
- b) a unit ~~(6)~~ for determining ~~the~~ a set imaging parameters of the device ~~(1)~~;
- c) a signal measurement unit ~~(8)~~ for detecting a movement signal which represents ~~the~~ movement phases of a periodic internal movement of the body;
- d) a storage unit ~~(7)~~ for storing an image database of 2D images of the body volume together with the associated imaging parameters and the associated movement phases;
- e) a position measurement unit ~~(6)~~ for determining the spatial position of the instrument ~~(5)~~ that is inserted into the body ~~and optionally the spatial position of at least one reference probe (2, 3)~~;
- d) a control and computation unit ~~(7)~~ for selecting at least one 2D image from the image database, which 2D image corresponds in terms of its associated movement phase to the movement phase belonging to the spatial position of the instrument, and for determining the position of the instrument ~~(5)~~ on the selected 2D image.

12. (Currently Amended) An arrangement as claimed in claim 11, ~~characterized in that wherein~~ it is designed for carrying out a method as claimed in ~~at least one of claims 1 to 10.~~

13. (New) An instrument tracking system comprising:

- a) a means for generating and storing 2D images of a volume of interest in a body prior to insertion of an instrument into the body;
- b) a means for measuring movement phases of a periodic internal movement of the body;
- c) a means for correlating said 2D images with said movement phases;
- d) a means for tracking the position of the instrument upon insertion into the body;
- e) a means for selecting a stored 2D image based on real-time measurement of the movement phases; and
- f) a means for superimposing the position of the instrument with the selected, stored 2D image.

14. (New) The instrument tracking system of claim 13 wherein the periodic internal movement of the body is caused by the cardiac system.

15. (New) The instrument tracking system of claim 13 wherein the periodic internal movement of the body is caused by the respiratory system.

16. (New) The instrument tracking system of claim 13 wherein the means for measuring movement phases includes an electrocardiogram.

17. (New) The instrument tracking system of claim 13 further comprising at least one reference probe positioned on at least one of the means for generating 2D images and the body.